

CTD data from collected from the R/V Oceanus OC1504A along the Oregon/California Coastal Upwelling Zone, between 34-44N and 120-124W during 2015

Website: <https://www.bco-dmo.org/dataset/652162>

Data Type: Cruise Results

Version: 1

Version Date: 2016-07-18

Project

» [Linking physiological and molecular aspects of diatom silicification in field populations](#) (Diatom Silicification)

Contributors	Affiliation	Role
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Abstract

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Coverage

Spatial Extent: N:43.65434 E:-120.81017 S:34.551 W:-124.48169

Temporal Extent: 2015-04-20 - 2015-05-01

Dataset Description

These are processed CTD data from the OCE1504A cruise, Molecular Underpinnings of Silicification in the California Current (MUSiCC), including fluorometry and dissolved O₂.

Methods & Sampling

Data were collected using a CTD fitted with a variety of sensors. See the event log for more details: DOI: 10.1575/1912/bco-dmo.651685.1

Data Processing Description

DMO notes:

BCO-DMO made the following modifications to the data display:

- Edited column names to meet BCO-DMO standards
- Added ISO date time column
- Added lat/lon coordinates using those found in the event log

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Data Files

File
MUSiCC_CTD_data.csv (Comma Separated Values (.csv), 46.37 KB) MD5:05fef35dac7ff511fccf5f2ab92bb61b
Primary data file for dataset ID 652162

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Parameters

Parameter	Description	Units
cruise	cruise name given to OC150A	unitless
CTD	CTD cast id	unitless
lat	latitude	decimal degrees
lon	longitude	decimal degrees
bottle	bottle number	unitless
date	date of cast; mm-bbb-yy	unitless
time	time of cast; HH:MM:SS	unitless
depth	depth of cast	meters
press	pressure in decibars	decibars
temp0	temperature in degrees C from sensor 1	celsius
temp1	temperature in degrees C from sensor 2	celsius
cond0	conductivity from sensor 1	siemens per meter
cond1	conductivity from sensor 2	siemens per meter
sal00	salinity from sensor 1	PSU
sal11	salinity from sensor 2	PSU
sigma_theta00	sigma theta density from sensor 1	kilograms per meter cubed
sigma_theta11	sigma theta density from sensor 2	kilograms per meter cubed
fluor	fluorescence	milligrams per meter cubed
trans	light transmission as percent	dimensionless
beam_c	beam attenuation (loss of light)	1/meters
O2_umol_kg	dissolved oxygen	micromoles per kilogram
PAR	photosynthetically available radiation	microEinsteins per meter squared per second
ISO_DateTime_UTC	DateTime (UTC) ISO formatted	unitless

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Deployments

OC1504A

Website	https://www.bco-dmo.org/deployment/560135
Platform	R/V Oceanus
Report	https://musicc2015.wordpress.com
Start Date	2015-04-19
End Date	2015-05-02
Description	Data for the project "Linking physiological and molecular aspects of diatom silicification in field populations" (PIs Kimberlee Thamatrakoln and Mark Brzezinski) were collected on this cruise.

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Project Information

Linking physiological and molecular aspects of diatom silicification in field populations (Diatom Silicification)

Coverage: Oregon/California Coastal Upwelling Zone, between 34-44N and 120-124W

Description from NSF award abstract:

Diatoms, unicellular, eukaryotic photoautotrophs, are among the most ecologically successful and functionally diverse organisms in the ocean. In addition to contributing one-fifth of total global primary productivity, diatoms are also the largest group of silicifying organisms in the ocean. Thus, diatoms form a critical link between the carbon and silicon (Si) cycles. The goal of this project is to understand the molecular regulation of silicification processes in natural diatom populations to better understand the processes controlling diatom productivity in the sea. Through culture studies and two research cruises, this research will couple classical measurements of silicon uptake and silica production with molecular and biochemical analyses of Silicification-Related Gene (SiRG) and protein expression. The proposed cruise track off the West Coast of the US will target gradients in Si and iron (Fe) concentrations with the following goals: 1) Characterize the expression pattern of SiRGs, 2) Correlate SiRG expression patterns to Si concentrations, silicon uptake kinetics, and silica production rates, 3) Develop a method to normalize uptake kinetics and silica production to SiRG expression levels as a more accurate measure of diatom activity and growth, 4) Characterize the diel periodicity of silica production and SiRG expression.

It is estimated that diatoms process 240 Teramoles of biogenic silica each year and that each molecule of silicon is cycled through a diatom 39 times before being exported to the deep ocean. Decades of oceanographic and field research have provided detailed insight into the dynamics of silicon uptake and silica production in natural populations, but a molecular understanding of the factors that influence silicification processes is required for further understanding the regulation of silicon and carbon fluxes in the ocean. Characterizing the genetic potential for silicification will provide new information on the factors that regulate the distribution of diatoms and influence in situ rates of silicon uptake and silica production. This research is expected to provide significant information about the molecular regulation of silicification in natural populations and the physiological basis of Si limitation in the sea.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1333929
NSF Division of Ocean Sciences (NSF OCE)	OCE-1334387

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